

Environmental Factors, Outdoor Air Quality, and Activity Level

Results from 2005 Kansas Behavioral
Risk Factor Surveillance System



Kansas BRFSS
Office of Health Promotion
Kansas Department of Health and Environment

Environmental Factors, Outdoor Air Quality and Activity Level 2005

State of Kansas
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Project Funding:

Funding for this report was provided by the Bureau of Air and Radiation (KDHE) and Council of State and Territorial Epidemiologist (CSTE).

**Kansas Department of Health and Environment
Office of Health Promotion**
August 2006

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BRFSS Overview

The Behavioral Risk Factor Surveillance System (BRFSS) is a random digit dial telephone survey among non-institutionalized adults age 18 years and older. In addition, adult respondents provide limited data on a randomly selected child in the household via surrogate interview. The BRFSS is coordinated and partially funded by the Centers for Disease Control and Prevention and is the largest continuously conducted telephone survey in the world. It is conducted in every state, the District of Columbia, and several United States territories. The first BRFSS survey in Kansas was conducted as a point-in-time survey in 1990, and Kansas has conducted the BRFSS survey annually since 1992.

The survey consists of approximately 130 questions and takes 15 minutes to complete. Survey topics on the 2005 Kansas BRFSS included: health status, health care access, exercise, diabetes, hypertension awareness, cholesterol awareness, cardiovascular disease awareness, asthma, immunizations, tobacco use, alcohol consumption, demographics, veteran's status, disability, arthritis, fruits and vegetables, physical activity, HIV/AIDS, emotional support and life satisfaction, childhood asthma, osteoporosis, epilepsy, falls, seatbelts, outdoor air quality and activity, durable power of attorney for health care decisions, and chronic pain.

The overall goal of the BRFSS is to develop and maintain the capacity for conducting population-based health risk surveys via telephone in Kansas. BRFSS data are used for the following:

- Monitor the leading contributors to morbidity and premature death
- Track health status and assess trends
- Measure knowledge, attitudes, and opinions
- Program planning
 - Needs assessment
 - Development of goals and objectives
 - Identification of target groups
- Policy development
- Evaluation

Data from BRFSS are weighted to account for the complex sample design and non-response bias such that the resulting estimates will be representative of the underlying population as a whole as well as for target subpopulations.

For more information about the Kansas BRFSS, including past questionnaires and data results, please visit: <http://www.kdheks.gov/brfss/index.html>

INTRODUCTION

The environment plays a vital role in the health of the population. According to the World Health Organization, approximately 25% of all preventable illness in the world is attributable to the environment (1).

Indoor air pollution is ranked among the top five environmental risks to public health (2). Sources of indoor air pollution include: oil, gas, kerosene, coal, wood, tobacco products, building materials, household cleaning products, heating and air conditioning systems, and poor air ventilation (3). Immediate health effects of indoor air pollution include: irritation of eyes, nose and throat, headaches, dizziness and fatigue. Long term effects of indoor air pollution include: asthma, chronic obstructive pulmonary disorder, heart disease and cancer (3). Exposure to secondhand smoke, a very important source of indoor pollution, has serious deadly effects. It results in premature death and disease in non-smokers (4). In 2005, second-hand smoke exposure was attributable to the deaths of: 46,000 adults from coronary heart disease, 3,000 adult nonsmokers from lung cancer and 430 newborns from sudden infant death syndrome (4). Each year, approximately 350 to 600 Kansans die from coronary heart disease and lung cancer attributable to second-hand smoke exposure (5).

Less is known about the impact of outdoor air information on health behaviors. This report is devoted to examining the impact of outdoor air quality on outdoor activity patterns. Outdoor air pollution can be classified as particle pollution and ozone pollution. Particle pollution is fine solid particles and aerosols suspended in the ambient air. Sources of particle pollution include: dust storms, construction, mining operations, burning of fossil fuels, automobile exhaust and numerous other sources (6). Ozone consists of three oxygen molecules and is the main component of smog. Ozone pollution is composed of nitrogen oxides, hydrocarbons, heat and sunlight. Immediate health effects of outdoor air pollution include coughing, wheezing, and eye irritation. Long term effects are the same for indoor air pollution (6). The annual health care costs associated with outdoor air pollution is approximately \$40-\$50 billion each year (1).

Sources of Emissions

The Environmental Protection Agency (EPA) defines emissions as gases and particles which are put into the air or emitted by various sources (7).

| Emission Categories | Description | Examples | Percentage of Air Pollution in Kansas |
|------------------------|--|--|---------------------------------------|
| Point Sources | Large stationary sources of emission | Natural gas compressor stations, petroleum refineries and grain processing or storage facilities | 12% |
| Area Sources | Individual emissions which do not qualify as point sources | Household solvents, paint, motor vehicle refueling and residential fuel combustion | 55% |
| On-road Mobile Sources | Non-stationary which can be driven on a highway. | Cars, trucks, buses, and motorcycles | 22% |
| Non-road Mobile | Non-stationary and not driven on highways | Lawnmowers, locomotives, and tractors | 11% |

- An estimated 55% of air pollution in Kansans comes from area sources such as household solvents, paints, motor vehicle refueling and residential fuel combustion (8).

A total of six environmental factors questions were added to the 2005 Kansas Behavioral Risk Factor Surveillance System (BRFSS). These questions focused on outdoor air quality, health, and outdoor activity patterns. Information gathered from these questions can be used to identify intervention opportunities for at-risk populations and evaluate the pervasiveness and impact of existing air quality information.

Question 1: Things like dust, mold, smoke, and chemicals inside the home or office can cause poor indoor air quality. In the past 12 months have you had an illness or symptom that you think was caused by something in the air inside a home, office, or other building?

| Response | Unweighted Frequency | Weighted Percentage | Standard Error | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|----------|----------------------|---------------------|----------------|-------------------------------|-------------------------------|
| Yes | 662 | 15.6 | 0.7 | 14.3 | 17.0 |
| No | 3507 | 84.4 | 0.7 | 83.0 | 85.7 |

Among all respondents, excluding unknowns and refusals.

- An estimated 440,000 (16%) adult Kansans thought they had an illness or symptom caused by something in the air inside a home, office or other building during the past 12 months.

Question 2: Things like smog, automobile exhaust, and chemicals can cause outdoor air pollution. In the past 12 months have you had an illness or symptom that you think was caused by pollution in the air outdoors?

| Response | Unweighted Frequency | Weighted Percentage | Standard Error | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|----------|----------------------|---------------------|----------------|-------------------------------|-------------------------------|
| Yes | 291 | 6.1 | 0.4 | 5.3 | 6.9 |
| No | 3889 | 93.9 | 0.4 | 93.1 | 94.7 |

Among all respondents, excluding unknowns and refusals.

- During the past 12 months, an estimated 165,000 (6%) adult Kansans thought they had an illness or symptom caused by pollution in the air outdoors.

CHANGING OUTDOOR ACTIVITY LEVEL BASED ON THOUGHT

Question 3: Please think of the past 12 months. How many times did you reduce or change your outdoor activity level because you thought the air quality was bad or was affecting how well you felt? For example, avoiding outdoor exercise or strenuous outdoor activity. Please do not include times when you made changes because of high pollen.

| Response | Unweighted Frequency | Weighted Percentage | Standard Error | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|-------------------|----------------------|---------------------|----------------|-------------------------------|-------------------------------|
| None | 3762 | 91.3 | 0.5 | 90.3 | 92.2 |
| 1 to 3 times | 216 | 5.1 | 0.4 | 4.3 | 5.9 |
| 4 to 6 times | 71 | 1.4 | 0.2 | 1.0 | 1.8 |
| More than 6 times | 113 | 2.2 | 0.2 | 1.8 | 2.7 |

Among all respondents, excluding unknowns and refusals.

- Not all behavioral changes are based on factual information. Individuals may change their behavior based on perception or thought.
- Approximately 1 out of 11 adults (9%) changed their outdoor activity level at least once during the past 12 months because they thought the air quality was bad or affected how well they felt.

Table A: Changed Behavior Because They Thought Outdoor Air Was Bad by Subpopulations

| Health Condition | % | 95% Confidence Interval | Demographic | % | 95% Confidence Interval |
|-------------------------------------|-------------|-------------------------|--------------------------------|-------------|-------------------------|
| TOTAL | 8.7 | (7.8-9.7) | AGE GROUP | | |
| SELF PERCEIVED HEALTH STATUS | | | 18-24 | 3.9 | (1.6-6.3) |
| Fair to Poor | 13.2 | (10.2-16.3) | 25-34 | 8.6 | (5.9-11.2) |
| Excellent to Good | 8.1 | (7.1-9.1) | 35-44 | 9.9 | (7.5-12.4) |
| DISABILITY STATUS | | | 45-54 | 10.8 | (8.5-13.1) |
| Living with a disability | 14.0 | (11.5-16.5) | 55-64 | 10.0 | (7.5-12.4) |
| Living without a disability | 7.5 | (6.5-8.6) | 65 + years | 8.3 | (6.5-10.1) |
| DIABETES STATUS | | | ANNUAL HOUSEHOLD INCOME | | |
| Has Diabetes | 13.4 | (9.1-17.7) | Less than \$15,000 | 13.3 | (8.1-18.6) |
| No Diabetes | 8.4 | (7.4-9.4) | \$15,000-\$24,999 | 9.0 | (6.5-11.5) |
| HYPERTENSION STATUS | | | \$25,000-\$34,999 | 10.0 | (7.2-12.8) |
| Hypertension | 10.8 | (8.7-13.0) | \$35,000-\$49,999 | 7.4 | (5.4-9.5) |
| No hypertension | 8.0 | (7.0-9.1) | \$50,000+ | 8.2 | (6.6-9.8) |
| ASTHMA STATUS | | | POPULATION DENSITY | | |
| Current Asthma | 21.8 | (16.4-27.1) | Frontier | 4.0 | (1.4-6.6) |
| No asthma | 7.7 | (6.7-8.7) | Rural | 5.4 | (3.4-7.4) |
| ARTHRITIS STATUS | | | Densely-settled rural | 8.2 | (5.9-10.5) |
| Has Arthritis | 13.2 | (11.1-15.3) | Semi-urban | 7.6 | (5.5-9.7) |
| No arthritis | 7.1 | (6.0-8.2) | Urban | 10.7 | (9.1-12.3) |

Among all respondents, excluding unknowns and refusals.

- As shown in Table A, adults with certain conditions (poor self-perceived health status, asthma, arthritis) and adults living in urban areas reported changing their outdoor activity level because they thought the outdoor air was bad.
 - Changing outdoor activity level because an individual thought the air was bad was significantly higher among adults who perceived their health as fair or poor (13.2%) than adults who perceived their health as excellent to good (8.1%).
 - As compared to adults without asthma, a significantly higher percentage of adults with asthma reported to have changed their outdoor activity level at least once during the past 12 months because they thought the air was bad (21.8% vs. 7.7%).
 - As compared to adults without arthritis, a significantly higher percentage of adults with arthritis reported to have changed their outdoor activity level at least once during the past 12 months because they thought the air was bad (13.2% vs. 7.1%).
 - Among Kansans living with a disability, 14% changed their outdoor activity level at least once during the past 12 months because they thought the air was bad compared with 7.5% of Kansans without a disability who changed their outdoor activity level at least once during the past 12 months because they thought the air was bad.
 - Significant differences were also apparent by population density of respondents. A significantly higher percentage of adults living in urban areas (10.7%) reported changing their outdoor activity level at least once during the past 12 months because they thought the air was bad compared with adults in frontier (4.0%) and rural areas (5.4%).

AIR QUALITY INDEX

The Air Quality Index (AQI) is a standardized number and color coded index, developed by the EPA, which helps individuals understand the quality of the air each day and the associated health risks. The AQI is based on the following pollutants which are regulated by the Clean Air Act: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide. The AQI measures limits from 0 – 500. The lower the number assigned that day, the better the quality of the air and the less health risk; the higher the number assigned, the worse the quality of the air and the greater the health risk. Children, the elderly, people with asthma, people with cardiovascular disease, and individuals who are active outdoors are classified as the sensitive group. Since these individuals are the first to feel the effects of air pollution, it is important for them to be aware of the air quality index and take precautionary steps when the index is over 100 (8-10).

| Air Quality Index Levels of Health Concern | Numerical Value | Meaning |
|---|--------------------|--|
| Good | 0-50 | Air quality is considered satisfactory, and air pollution poses little or no risk. |
| Moderate | 51-100 | Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution. |
| Unhealthy for Sensitive Groups | 101-150 | Members of sensitive groups may experience health effects. The general public is not likely to be affected. |
| Unhealthy | 151-200 | Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects. |
| Very Unhealthy | 201-300 | Health alert: everyone may experience more serious health effects. |
| Hazardous | > 300 | Health warnings of emergency conditions. The entire population is more likely to be affected. |

- In Kansas, the AQI is available for the Wichita and Kansas City Metropolitan areas.
- For more information about the AQI and to see the AQI for Kansas, please visit:
www.airnow.gov

Question 4: The government routinely collects information on air quality that may be distributed by local radio, TV and newspapers to help inform the public about air pollution levels. Have you ever heard or read about the air quality index or air quality alerts where you live? Please do not include times when you may have heard or read about high pollen counts.

| Response | Unweighted Frequency | Weighted Percentage | Standard Error | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|----------|----------------------|---------------------|----------------|-------------------------------|-------------------------------|
| Yes | 1857 | 42.7 | 0.9 | 40.9 | 44.5 |
| No | 2319 | 57.3 | 0.9 | 55.5 | 59.1 |

Among all respondents, excluding unknowns and refusals.

- 43% of adult Kansans were aware of the air quality index or air quality alerts.

Question 5: Please think of the past 12 months. How many times did you reduce or change your outdoor activity level based on the air quality index or air quality alerts? For example, avoiding outdoor exercise or strenuous outdoor activity. Please do not include times when you may have heard or read about high pollen counts.

| Response | Un-weighted Frequency | Weighted Percent-age | Stan-dard Error | Lower 95% Con-fidence Interval | Upper 95% Confidence Internal |
|-------------------|-----------------------|----------------------|-----------------|--------------------------------|-------------------------------|
| None | 1555 | 84.8 | 1.0 | 82.8 | 86.7 |
| 1 to 3 times | 163 | 9.0 | 0.8 | 7.4 | 10.5 |
| 4 to 6 times | 66 | 3.1 | 0.5 | 2.2 | 4.0 |
| More than 6 times | 65 | 3.2 | 0.5 | 2.2 | 4.1 |

Among respondents who have heard or read about the air quality index or air quality alerts where they live, excluding unknowns and refusals.

- Among those who were aware of the air quality index or air quality alerts, 15% changed their outdoor activity level at least once in the past 12 months based on the air quality index or air quality alert.

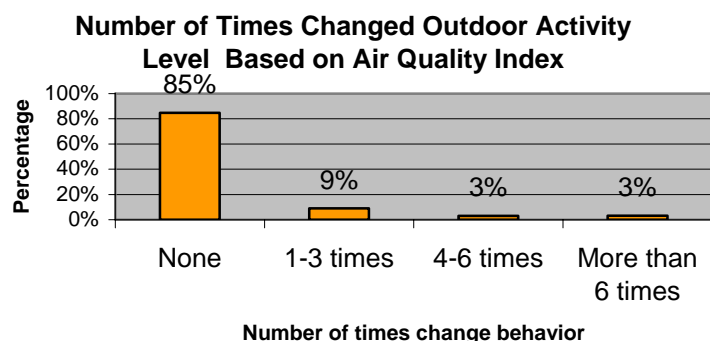
Table B: Percentage of Adults Aware of Air Quality Index by Subpopulations

| Health Condition | % | 95% Confidence Interval |
|-------------------------------------|--------------|-------------------------|
| TOTAL | 42.7% | (40.9-44.5) |
| SELF PERCEIVED HEALTH STATUS | | |
| Fair to Poor | 40.9 | (36.3-45.4) |
| Excellent to Good | 43.1 | (41.1-45.0) |
| DISABILITY STATUS | | |
| Living with a disability | 43.6 | (39.9-47.2) |
| Living without a disability | 42.5 | (40.4-44.6) |
| DIABETES STATUS | | |
| Has Diabetes | 44.3 | (38.5-50.1) |
| No Diabetes | 42.6 | (40.7-44.5) |
| HYPERTENSION STATUS | | |
| Hypertension | 45.9 | (42.4-49.1) |
| No hypertension | 41.7 | (39.5-43.8) |
| ASTHMA STATUS | | |
| Current Asthma | 46.0 | (38.9-53.0) |
| No asthma | 42.5 | (40.6-44.4) |
| ARTHRITIS STATUS | | |
| Has Arthritis | 47.6 | (44.6-50.6) |
| No arthritis | 40.8 | (38.6-43.1) |

| Demographic | % | 95% Confidence Interval |
|--------------------------------|-------------|-------------------------|
| AGE GROUP | | |
| 18-24 | 28.5 | (21.8-35.1) |
| 25-34 | 37.9 | (33.2-42.6) |
| 35-44 | 45.0 | (41.0-49.0) |
| 45-54 | 46.9 | (43.2-50.5) |
| 55-64 | 52.7 | (48.7-56.7) |
| 65 + years | 44.7 | (41.6-47.8) |
| ANNUAL HOUSEHOLD INCOME | | |
| Less than \$15,000 | 31.0 | (23.5-38.5) |
| \$15,000-\$24,999 | 32.5 | (27.8-37.1) |
| \$25,000-\$34,999 | 39.8 | (34.7-45.0) |
| \$35,000-\$49,999 | 40.3 | (36.2-44.5) |
| \$50,000+ | 53.2 | (50.2-56.1) |
| POPULATION DENSITY | | |
| Frontier | 24.6 | (15.8-33.3) |
| Rural | 29.1 | (24.4-33.8) |
| Densely-settled rural | 24.3 | (20.7-27.9) |
| Semi-urban | 37.7 | (33.7-41.7) |
| Urban | 57.1 | (54.3-59.8) |

Among all respondents, excluding unknowns and refusals

- Among adults ages 18-24 years, 29% were aware of the air quality index. This is less compared to adults 35-44 years (38%), ages 45-54 years (45%), ages 55-64 years (53%) and adults 65 years and older (45%).
- An estimated 57% of adults living in urban Kansas counties were aware of the air quality index.
- Adults of all income levels who were the most aware of the air quality index were those with an annual household income level of at least \$50,000. Approximately 1 out of 2 (53%) adults with an annual household income level of at least \$50,000 were aware of the air quality index.
- Among adults living in the Kansas City Metropolitan Statistical Area, 70% were aware of the air quality index.
- Among adults living in the Wichita Metropolitan Statistical Area, 37% were aware of the air quality index.
- Among adults living in the Topeka Metropolitan Statistical Area, 37% were aware of the air quality index.



- Among adults who were aware of the air quality index, 15% changed their outdoor activity level at least once during the past 12 months based on the air quality index.
- 9% of adults who were aware of the air quality index changed their outdoor activity level 1 to 3 times during the past 12 months based on information from the air quality index.

Table C: Percentage of Adults Who Changed Outdoor Activity Behavior At Least Once During the Past 12 Months Based on the Air Quality Index or Air Quality Alerts by Subpopulations

| Health Condition | % | 95% Confidence Interval |
|-------------------------------------|-------------|-------------------------|
| TOTAL | 15.2 | (13.3-17.2) |
| SELF PERCEIVED HEALTH STATUS | | |
| Fair to Poor | 19.0 | (14.0-24.0) |
| Excellent to Good | 14.8 | (12.7-16.8) |
| DISABILITY STATUS | | |
| Living with a disability | 18.5 | (14.5-22.5) |
| Living without a disability | 14.5 | (12.3-16.7) |
| DIABETES STATUS | | |
| Has Diabetes | 17.0 | (10.9-23.0) |
| No Diabetes | 15.1 | (13.1-17.1) |
| HYPERTENSION STATUS | | |
| Hypertension | 15.7 | (12.2-19.1) |
| No hypertension | 15.1 | (12.8-17.4) |
| ASTHMA STATUS | | |
| Current Asthma | 32.6 | (23.7-41.6) |
| No asthma | 13.7 | (11.8-15.6) |
| ARTHRITIS STATUS | | |
| Has Arthritis | 18.3 | (14.9-21.7) |
| No arthritis | 14.0 | (11.7-16.3) |

| Demographic | % | 95% Confidence Interval |
|--------------------------------|-------------|-------------------------|
| AGE GROUP | | |
| 18-24 | 11.9 | (3.2-20.6) |
| 25-34 | 17.1 | (11.2-23.1) |
| 35-44 | 18.5 | (14.0-23.0) |
| 45-54 | 15.5 | (11.7-19.3) |
| 55-64 | 15.8 | (1.8-19.8) |
| 65 + years | 11.1 | (8.1-14.1) |
| ANNUAL HOUSEHOLD INCOME | | |
| Less than \$15,000 | 17.8 | (8.6-27.1) |
| \$15,000-\$24,999 | 17.9 | (11.0-24.8) |
| \$25,000-\$34,999 | 14.0 | (9.3-18.7) |
| \$35,000-\$49,999 | 15.6 | (11.0-20.1) |
| \$50,000+ | 15.4 | (12.5-18.3) |
| POPULATION DENSITY | | |
| Frontier | 6.0 | (0.0-12.8) |
| Rural | 6.4 | (2.8-10.0) |
| Densely-settled rural | 7.7 | (4.0-11.4) |
| Semi-urban | 10.0 | (6.5-13.5) |
| Urban | 19.4 | (16.6-22.1) |

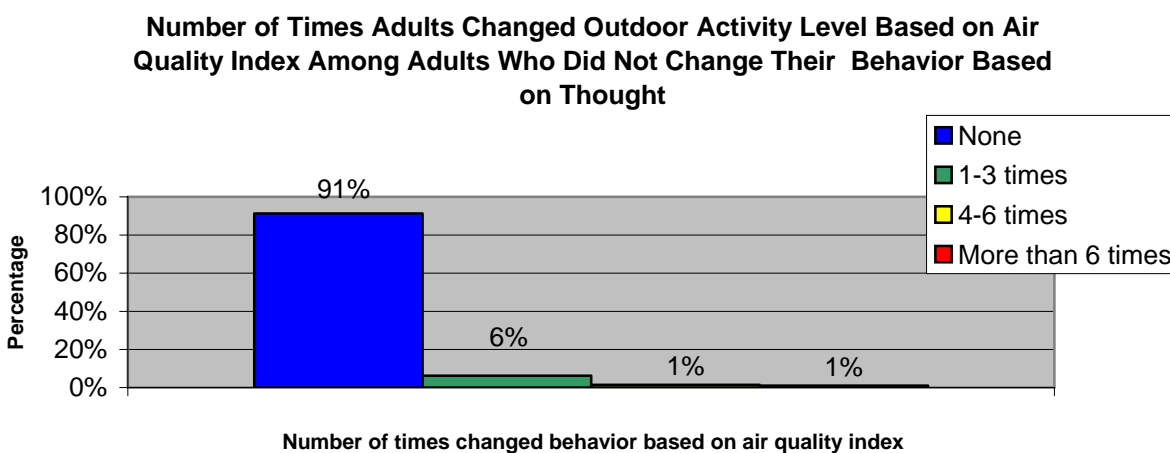
Among who are aware of the air quality index, excluding unknowns and refusals

- Among adults with current asthma who were aware of the air quality index, 33% changed their outdoor activity level at least once during the past 12 months based on the air quality index.
- Approximately 1 out of 5 adults (19%) who live in urban counties of Kansas and were aware of the air quality index changed their outdoor air activity at least once during the past 12 months based on the air quality index.

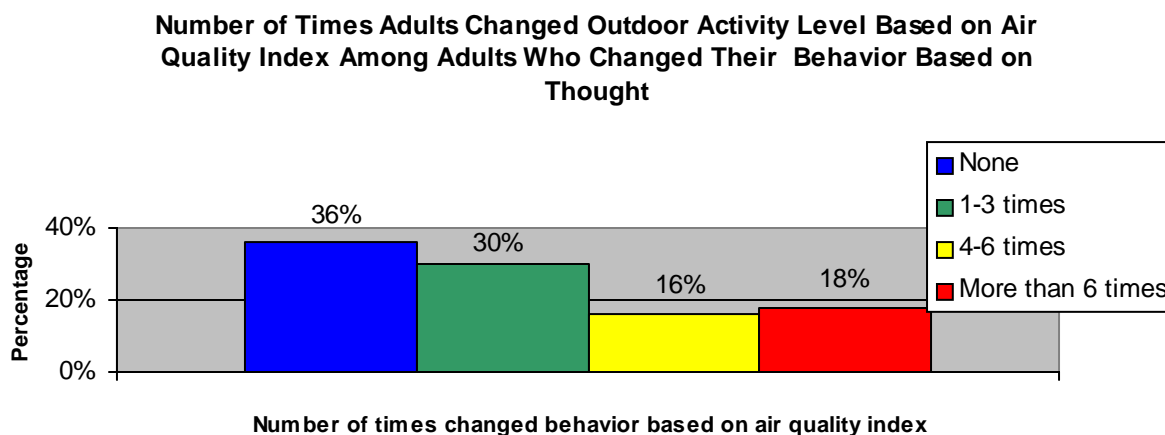
BEHAVIOR CHANGE: THOUGHT VS AIR QUALITY INDEX

As previously indicated, 9% of adult Kansans changed their outdoor activity level at least once during the past 12 months because they thought the air was bad, whereas 15% of adult Kansans who were aware of the air quality index changed their outdoor activity level at least once during the past 12 months based on information from the air quality index.

The graphs below examine the difference between those who changed their activity level based on perception of air quality and based on air quality data. As shown in the graphs below, change in outdoor activity level based on air quality index (AQI) was seen among those who did not change their activity level based on thought and among those who did change their activity level based on thought.



- Among adults who did not change their outdoor activity level because they thought the air was bad, 8% changed their behavior at least once in the past 12 months based on air quality index or air quality alerts.



- Among adults who changed their outdoor activity level at least once because they thought the air was bad, 64% changed their outdoor activity behavior at least once in the past 12 months based on air quality index or air quality alerts.

HEALTH CARE PROFESSIONAL ADVICE TO CHANGE BEHAVIOR WHEN THE AIR IS BAD.

Sensitive groups such as individuals with asthma, chronic obstructive pulmonary disorder (COPD), cardiovascular disease, and the elderly should reduce their outdoor activity level when the air quality is bad (9,10). These individuals should receive advice from their health care professional regarding their outdoor activity level.

- An estimated 4% of adults have been advised by a doctor, nurse, or other health professional to reduce their outdoor activity level when the air is bad.

Question 6: Has a doctor, nurse, or other health professional ever told you to reduce your outdoor activity level when the air quality is bad?

| Response | Unweighted Frequency | Weighted Percentage | Standard Error | Lower 95% Confidence Interval | Upper 95% Confidence Interval |
|----------|----------------------|---------------------|----------------|-------------------------------|-------------------------------|
| Yes | 189 | 4.0 | 0.3 | 3.3 | 4.7 |
| No | 4002 | 96.0 | 0.3 | 95.3 | 96.7 |

Among all respondents, excluding unknowns and refusals.

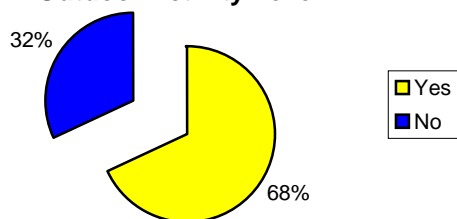
Table D: Advised by Health Care Provider to Change Outdoor Activity Level When Air is Bad by Subpopulation

| Health Condition | % | 95% Confidence Interval | Demographic | % | 95% Confidence Interval |
|-------------------------------------|------------|-------------------------|--------------------------------|-----|-------------------------|
| TOTAL | 4.0 | (3.3-4.7) | AGE GROUP | | |
| SELF PERCEIVED HEALTH STATUS | | | 18-24 | 1.8 | (0.0-3.9) |
| Fair to Poor | 9.8 | (7.3-12.3) | 25-34 | 3.9 | (2.0-5.7) |
| Excellent to Good | 3.2 | (2.5-3.9) | 35-44 | 3.6 | (2.2-5.1) |
| DISABILITY STATUS | | | 45-54 | 4.7 | (3.2-6.2) |
| Living with a disability | 8.4 | (6.4-10.3) | 55-64 | 6.0 | (4.1-7.8) |
| Living without a disability | 3.0 | (2.3-3.7) | 65 + years | 4.1 | (2.8-5.4) |
| DIABETES STATUS | | | ANNUAL HOUSEHOLD INCOME | | |
| Has Diabetes | 7.9 | (5.0-10.9) | Less than \$15,000 | 9.1 | (5.0-13.2) |
| No Diabetes | 3.7 | (3.0-4.4) | \$15,000-\$24,999 | 6.0 | (3.5-8.5) |
| HYPERTENSION STATUS | | | \$25,000-\$34,999 | 3.3 | (1.8-4.8) |
| Hypertension | 5.8 | (4.4-7.3) | \$35,000-\$49,999 | 2.6 | (1.4-3.8) |
| No hypertension | 3.4 | (2.6-4.2) | \$50,000+ | 3.6 | (2.6-4.6) |
| ASTHMA STATUS | | | POPULATION DENSITY | | |
| Current Asthma | 15.7 | (11.3-20.1) | Frontier | 5.9 | (0.0-12.4) |
| No asthma | 3.1 | (2.4-3.7) | Rural | 2.5 | (1.1-3.8) |
| ARTHRITIS STATUS | | | Densely-settled rural | 3.2 | (1.9-4.5) |
| Has Arthritis | 5.3 | (4.0-6.6) | Semi-urban | 3.5 | (2.1-4.8) |
| No arthritis | 3.5 | (2.7-4.3) | Urban | 4.7 | (3.7-5.7) |

- Only 16% of adults with current asthma have been advised by a health care provider to change their outdoor activity level when the air is bad.
- Less than 5% of adults ages 65 years and older have been advised by a health care provider to change their outdoor activity level when the air is bad.

Among all respondents, excluding unknowns and refusals

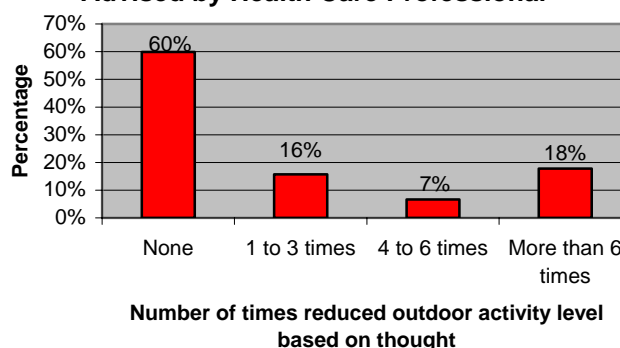
**Awareness of Air Quality Index
among Adults Receiving Health
Care Professional Advice to Reduce
Outdoor Activity Level**



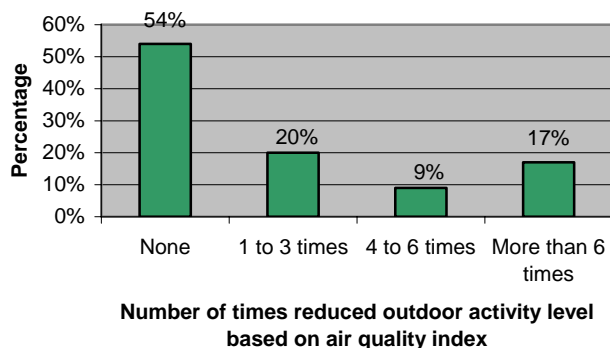
- Among adults advised by a health care professional to reduce their outdoor activity level when the air is bad, 68% are aware of the air quality index or air quality alerts.

- Approximately 40% of adults who were advised by a health care professional to reduce their outdoor activity level when the air was bad, changed their behavior at least once in the past 12 months because they thought the outdoor air was bad.

**Number of Times Adults Changed
Behavior Because They Thought The Air
Was Bad Among Adults Who Were
Advised by Health Care Professional**



**Number of Times Adults Changed
Behavior Based On Air Quality Index
Among Adults Who Were Advised by
Health Care Professional**



- Among adults advised by a health care professional to change their outdoor activity level when the air is bad, 56% are aware of the air quality index and changed their behavior at least once during the past 12 months based on air quality index or air quality alerts.

Technical Notes

Questionnaire Design

The survey consists of three sections:

- Core questions are asked by all states. The order the questions appear and the wording of the questions are fairly consistent across all states. Types of core questions include fixed, rotating, and emerging health issues.
 - Fixed core: contains questions that are asked every year. Fixed core topics include health status, health care access, healthy days, life satisfaction, emotional satisfaction, disability, tobacco use, alcohol use, exercise, immunization, HIV/AIDS, diabetes, asthma, and cardiovascular disease.
 - Rotating core: contains questions asked every other year.
 - Odd years (2005, 2007, 2009, etc): fruits and vegetables, hypertension awareness, cholesterol awareness, arthritis burden, and physical activity.
 - Even years (2006, 2008, 2010, etc): women's health, prostate screening, colorectal cancer screening, oral health and injury.
 - Emerging Health Issues: contains late breaking health issue questions. At the end of the survey year, these questions are evaluated to determine if they should be a part of the fixed core.
- Optional Modules include questions on a specific health topic. The CDC provides a pool of questions from which states may select. States have the option of adding these questions to their survey. The CDC's responsibilities regarding these questions include development of questions, cognitive testing, financial support to states to include these questions on the questionnaire, data management, limited analysis and quality control.
- State added questions are based on public health needs of each state. State added questions include questions not available as supported optional modules in that year or emerging health issues that are specific to each state. Any modifications made to the CDC support modules available in that year make the module a state added module. The CDC has no responsibilities regarding these questions.

Each year, stakeholders are invited to attend an annual planning meeting and propose optional modules and state added questions to be added to the survey. Then, a survey selection committee consisting of the BRFSS Coordinator, Director of Science and Surveillance, Special Studies Section Director, Senior Epidemiologist, and Office of Health Promotion Director meet to determine the questionnaire content. The survey selection committee uses a specific set of criteria to determine the questionnaire's content.

Split Questionnaire

In order to accommodate increasing data needs, the 2005 Kansas BRFSS was a split questionnaire. CDC optional modules and state added questions are organized by topics into two sections: questionnaire A and questionnaire B. Each telephone number is randomly assigned to questionnaire A and questionnaire B prior to being called. All respondents answer questions from the core section. Then, approximately half of the respondents will receive questionnaire A and the remaining will receive questionnaire B. Environmental factors questions used in this data report were on questionnaire A.

Advantages of a split questionnaire:

- Collect data on numerous topics within one data year
- Collect in-depth data on one specific topic
- Ability to keep questionnaire time and length to a minimum

Disadvantages of a split questionnaire:

- Complexity of data weighting; additional weighting factors are needed
- Variables on questionnaire A cannot be analyzed with variables on questionnaire B

Sampling

The 2005 BRFSS was conducted using a disproportionate stratified sampling method. This method of probability sampling involved assigning sets of one hundred telephone numbers with the same area code, prefix and first two digits of suffix and all possible combinations of the last two digits (“hundred blocks”) into two strata. Those hundred blocks that have at least one known listed household number are designated high density (also called “one-plus block”); hundred blocks with no known listed household numbers are designated low density (“zero blocks”). The high-density stratum is sampled at a higher rate than the low density stratum resulting in greater efficiency. Approximately the same number of households are called each month throughout the calendar year to reduce bias caused by seasonal variation of health risk behaviors.

Potential working telephone numbers were dialed during three separate calling periods (daytime, evening, and weekends) for a total of 15 call attempts before being replaced. Upon reaching a valid household number, one household member ages 18 years and older was randomly selected. If the selected respondent was not available, an appointment was made to call at a later time or date. Because respondents were selected at random and no identifying information was solicited, all responses to this survey were anonymous. In 2005, 8626 adult residents of Kansas were interviewed.

Response Rate

The CASRO (Council of American Survey Research Organizations) response rate for the 2005 Kansas BRFSS survey was 61.59 %. The CASRO formula is based on the number of interviews completed, the number of households reached, and the number of household with unknown eligibility status. The CASRO response rate is used because in addition to those persons who refused to answer questions, lack of response can also arise because household members were not available despite repeated call attempts, or household members refused to pick up the phone based on what they discern from caller ID.

Limitations

As with any research method, the BRFSS has limitations.

- BRFSS is conducted among non-institutionalized adults and therefore excludes individuals without telephone service, those on military bases, and individuals in institutions.
- All information is self-reported which may introduce bias such as recall bias, reporting bias, etc.
- Due to the sampling and population rate, it is often difficult to obtain subpopulation data such as county level data or data on minorities.
- BRFSS is not ideal for low prevalence conditions.

Weighting Procedures

Weighting is a process by which the survey data are adjusted to account for unequal selection probability and response bias and to more accurately represent the population from which the sample was drawn. The response of each person interviewed were assigned a weight which accounted for the density stratum, the number of telephones in the household, the number of adults in the household, and the demographic distribution of the sample.

Estimates

Data results from the BRFSS are estimates of the real population prevalence. To account for sampling error and for the accuracy of the estimate, we calculate 95% confidence intervals. A confidence interval contains an upper and lower limit. We are 95% confident that the true percentage is between the lower limit and the upper limit. The smaller the range between the lower limit and upper limit, the more precise the estimated percentage is. In other words, the narrower the confidence interval, the better.

Demographic Description of Respondents on Questionnaire A

Number of respondents on questionnaire A was 4315

| Demographic Variables | N | Unweighted Percentage | Weighted Percentage |
|------------------------------------|------|-----------------------|---------------------|
| AGE | | | |
| 18-24 | 217 | 5.04 | 14.42 |
| 25-34 | 516 | 11.99 | 17.37 |
| 35-44 | 763 | 17.73 | 18.69 |
| 45-54 | 881 | 20.47 | 18.91 |
| 55-64 | 721 | 16.76 | 13.04 |
| 65 + years | 1205 | 28.00 | 17.57 |
| SEX | | | |
| Male | 1674 | 38.79 | 48.97 |
| Female | 2641 | 61.21 | 51.03 |
| ETHNICITY | | | |
| Hispanic | 197 | 4.57 | 6.05 |
| Non-Hispanic | 416 | 95.43 | 93.95 |
| RACE | | | |
| White only | 3886 | 90.14 | 88.87 |
| Black Only | 123 | 2.85 | 2.61 |
| Other race only | 234 | 5.43 | 7.01 |
| More than one race | 68 | 1.58 | 1.51 |
| MARITAL STATUS | | | |
| Married/Member of Unmarried couple | 2660 | 61.75 | 68.30 |
| Divorced/Separated | 636 | 14.76 | 9.45 |
| Widowed | 555 | 12.88 | 6.63 |
| Never Married | 457 | 10.61 | 15.61 |
| EDUCATION | | | |
| Less than High School | 329 | 7.63 | 8.57 |
| High School graduate or G.E.D | 1316 | 30.51 | 30.57 |
| Some College | 1212 | 28.09 | 27.82 |
| College Graduate | 1457 | 33.77 | 33.04 |
| ANNUAL HOUSEHOLD INCOME | | | |
| Less than \$15,000 | 298 | 7.99 | 7.34 |
| \$15,000-\$24,999 | 705 | 18.91 | 17.47 |
| \$25,000-\$34,999 | 565 | 15.16 | 13.88 |
| \$35,000-\$49,999 | 708 | 18.99 | 18.82 |
| \$50,000 + | 1452 | 38.95 | 42.48 |
| POPULATION DENSITY | | | |
| Frontier | 197 | 4.58 | 4.20 |
| Rural | 558 | 12.98 | 13.15 |
| Densely-settled rural | 722 | 16.79 | 17.23 |
| Semi-urban | 813 | 18.91 | 18.63 |
| Urban | 2009 | 46.73 | 46.79 |

*Estimates for various categories of demographic variables are based on responses from all respondents excluding unknowns and refusals

POPULATION DENSITY

Based on 2000 U.S. Census

| Category | Definition | Kansas Counties |
|-----------------------|--------------------------------|--|
| Frontier | <6 persons/square mile | Barber, Chase, Cheyenne, Clark, Comanche, Decatur, Edwards, Elk, Gove, Graham, Greeley, Hamilton, Hodgeman, Jewell, Kearny, Kiowa, Lane, Lincoln, Logan, Meade, Morton, Ness, Osborne, Rawlins, Rush, Sheridan, Smith, Stanton, Trego, Wallace, Wichita |
| Rural | 6 to <20 persons/square mile | Anderson, Brown, Chautauqua, Clay, Cloud, Coffey, Ellsworth, Grant, Gray, Greenwood, Harper, Haskell, Jackson, Kingman, Linn, Marion, Marshall, Mitchell, Morris, Nemaha, Norton, Ottawa, Pawnee, Phillips, Pratt, Republic, Rice, Rooks, Russell, Scott, Sherman, Stafford, Stevens, Thomas, Wabaunsee, Washington, Wilson, Woodson |
| Densely Settled Rural | 20 to <40 persons/square mile | Allen, Atchison, Barton, Bourbon, Cherokee, Cowley, Dickinson, Doniphan, Ellis, Finney, Ford, Jefferson, Labette, McPherson, Neosho, Osage, Pottawatomie, Seward, Sumner, |
| Semi-urban | 40 to <150 persons/square mile | Butler, Crawford, Franklin, Geary, Harvey, Leavenworth, Lyon, Miami, Montgomery, Reno, Riley, Saline |
| Urban | 150+ persons/square mile | Douglas, Johnson, Sedgwick, Shawnee, Wyandotte |

METROPOLITAN STATISTICAL AREA

Metropolitan statistical area (MSA) is a geographic county subdivision containing at least one urbanized area of at least 50,000 people.

For more information about MSA, visit the U. S Census Bureau's website at <http://www.census.gov/population/www/estimates/metroarea.html>

Description of subpopulation analysis variables

Living with a disability: Answer “Yes” to one of the following questions:

1. Are you limited in any way in any activities because of physical, mental, or emotional problems?
1 Yes
2 No
7 Don’t know / Not sure
9 Refused
2. Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?

Note: Include occasional use or use in certain circumstances.

- 1 Yes
- 2 No
- 7 Don’t know / Not sure
- 9 Refused

Diabetes: Answer “Yes” to the following question:

1. Have you EVER been told by a doctor that you have diabetes?

Note: If respondent says ‘pre-diabetes or borderline diabetes’, use response **Code 4**.

- 1 Yes
- 2 Yes, but female told only during pregnancy
- 3 No
- 4 No, pre-diabetes or borderline diabetes
- 7 Don’t know / Not sure
- 9 Refused

If “Yes” and respondent is female, ask: “Was this only when you were pregnant?”

Hypertension: Answer “Yes” to the following question:

1. Have you EVER been told by a doctor, nurse, or other health professional that you have high blood pressure?

If “Yes” and respondent is female, ask: “*Was this only when you were pregnant?*”

- 1 Yes
- 2 Yes, but female told only during pregnancy
- 3 No
- 4 Told borderline high or pre-hypertensive
- 7 Don’t know / Not sure
- 9 Refused

Asthma : Answer “Yes” to both of the following questions:

1. Have you EVER been told by a doctor, nurse, or other health professional that you had asthma?

- 1 Yes
- 2 No
- 7 Don’t know / Not sure
- 9 Refused

2. Do you still have asthma?

- 1 Yes
- 2 No
- 7 Don’t know / Not sure
- 9 Refused

Arthritis: Answer “Yes” to the following question:

1. Have you EVER been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?(156)

- 1 Yes
- 2 No
- 7 Don’t know / Not sure
- 9 Refused

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